

Application Serial No. 10/685,073

Amendment & Response to Office Action dated February 23, 2006

MSE-2671

AMENDMENTS TO CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A lancing device for use with a lance, the device comprising:
a parallelogram-shaped gear rack;
a pinion rotatably supported in the gear rack, ~~wherein rotation of the pinion is coupled to movement of the rack~~ the pinion being rotated in response to the movement of the gear rack;
a slider-crank system comprising a drive arm coupled to the pinion; and
a lance holder coupled to the drive arm, wherein rotation of the pinion drives the lance holder in linear motion.
2. (Original) The device of claim 1, comprising a drive wheel coupling the drive arm to the pinion.
3. (Currently Amended) ~~The device of claim 1, wherein:~~ A lancing device for use with a lance, the device comprising:
a parallelogram-shaped rack;
a pinion rotatably supported in the rack, the pinion being rotated in response to the movement of the gear rack;
a slider-crank system comprising a drive arm coupled to the pinion; and
a lance holder coupled to the drive arm, wherein rotation of the pinion drives the lance holder in linear motion,
wherein the parallelogram-shaped rack comprises a proximal acute angle, and a distal acute angle positioned closer to the lance holder than the proximal acute angle, and
wherein the pinion rotates 180° when moving between the distal acute angle and the proximal acute angle.
4. (Original) The device of Claim 3, wherein the lance holder moves from a cocked position to a fired position and wherein the lance holder is in the cocked position when the pinion is positioned at the distal acute angle and in the fired position when the pinion is positioned at the proximal acute angle.

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5. (Currently Amended) The device of claim 3, further comprising:
a first guide pin fixed relative to the parallelogram-shaped rack; and
a first guide track linearly fixed relative to the pinion, wherein the first guide pin movable interfaces with the first guide track as the parallelogram-shaped rack moves relative to the pinion, whereby movement of the rack is guided.

6. (Currently Amended) The device of Claim 5, further comprising:
a second guide pin fixed relative to the parallelogram-shaped rack, wherein the rack is positioned between the first and second guide pins; and
a second guide track fixed relative to the first guide track, wherein the pinion is positioned between the first and second guide tracks and the second guide pin movable interfaces with the second guide track as the parallelogram-shaped rack moves relative to the pinion.

7. (Original) The device of Claim 6, wherein the first and second guide tracks are parallelogram shaped.

8. (Original) The device of Claim 5, wherein the first guide track is parallelogram shaped.

9. (Currently Amended) The device of Claim 8, wherein the first guide pin is ~~parallelogram~~ cylindrically shaped.

10. (Currently Amended) The device of Claim 1, further comprising a drive spring positioned to move the lance holder.

11. (Original) The device of Claim 10, wherein the parallelogram-shaped rack is positioned between the lance holder and the drive spring.

12. (Currently Amended) ~~The device of Claim 1 wherein:~~ A lancing device for use with a lance, the device comprising:

a parallelogram-shaped rack, the rack comprises comprising four segments;

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a pinion rotatably supported in the rack, the pinion being rotated in response to the movement of the rack, the pinion moves moving between a first acute angle position and a second acute angle position, [[:]] the pinion comprises comprising teeth;

a slider-crank system comprising a drive arm coupled to the pinion; and
a lance holder coupled to the drive arm, wherein rotation of the pinion drives the lance holder in linear motion.

wherein the rack segments comprise teeth adapted to engage the pinion teeth [[:]] and at least two teeth on each segment are modified to reduce chances of the pinion jamming at either one of the first and second acute angle positions.

13. (Withdrawn) The device of claim 1, wherein the pinion rotates 360° as the lance holder linearly moves from a cocked position to a fired position and back to the cocked position.

14. (Currently Amended) A lancing device for use with a lance, the device comprising:
a frame comprising a parallelogram-shape gear rack, wherein the frame [[:]] being movably supported;

a pinion rotatably mounted to interface the gear rack, wherein rotation of the pinion is coupled to movement of the rack the pinion being rotated in response to the movement of the gear rack; and

a lance holder movable between a fired position and a cocked position, wherein movement of the lance holder is in response to rotation of the pinion.

15. (Original) The device of Claim 14, wherein the lance holder moves from the cocked position to the fired position as the pinion rotates 180°.

16. (Original) The device of Claim 15, wherein the pinion traverses approximately one-half of the rack as the lance holder moves from the cocked position to the fired position.

17. (Currently Amended) ~~The device of Claim 14, wherein~~ A lancing device for use with a lance, the device comprising:

a frame comprising a parallelogram-shape rack, the frame being movably supported;

a pinion rotatably mounted to interface the rack, the pinion being rotated in response to the movement of the gear rack; and

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a lance holder movable between a fired position and a cocked position, wherein movement of the lance holder is in response to the rotation of the pinion.

wherein the parallelogram-shaped rack comprises a first acute angle and a second acute angle and the pinion is positioned proximate to the first acute angle when the lance holder is in the cocked position and the pinion is positioned proximate to the second acute angle when the lance holder is in the fired position.

18. (Original) The device of Claim 17, wherein the pinion rotates 180° as the pinion moves from the first acute angle to the second acute angle.

19. (Cancelled) A lancing device for use with a lance, the device comprising:
a plate;
a pinion linearly fixed relative to the plate;
a frame movable relative to the plate and comprising two rack segments positioned to form an oblique angle between the two rack segments, wherein the frame is movable between a cocked position and a fired position and the pinion is positioned to travel along the two rack segments as the frame moves from the cocked position to the fired position; and
a lance holder coupled to movement of the pinion, wherein the lance holder is linearly movable from a retracted position to an extended position as the frame moves from the cocked position to the fired position.

20. (Cancelled) The device of Claim 19, comprising a spring positioned to move the frame from the cocked position to the fired position.

21. (Cancelled) The device of Claim 19, comprising a slider-crank system coupling movement of the pinion to the lance holder, wherein moving the frame moves the lance holder.

22. (Cancelled) The device of Claim 21, wherein the slider-crank system comprises a drive arm connecting the pinion and the lance holder.

23. (Cancelled) The device of Claim 22, wherein the pinion rotates 180° as the frame moves from the cocked position to the fired position.

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24. (Cancelled) The device of Claim 19, comprising guide means for guiding movement of the frame relative to the plate.

25. (Cancelled) The device of Claim 19, comprising slider-crank means for coupling movement of the pinion to the lance holder, wherein moving the frame moves the lance holder.

26. (Currently Amended) A lancing device for use with a lance, the device comprising:
a frame;

gear rack and pinion means for moving the frame along a predetermined path from a cocked position to a fired position, ~~wherein the~~ gear rack and pinion means ~~comprises~~ comprising one or more rack segments fixed relative to the frame, and a pinion interfacing the one or more rack segments;

lance holder means for holding and moving the lance in linear motion from a retracted position to a predetermined extended position;

means for coupling movement of the frame to the lance holder means such that the lance holder moves the lance from the retracted position to the extended position as the frame moves from the cocked position to the fired position along the predetermined path; and

means for preventing the lance from extending beyond the predetermined extended position.

27. (Currently Amended) The device of Claim 26, further comprising guide means for guiding the frame along the predetermined path.

28. (Currently Amended) The device of Claim 26, further comprising spring means for moving the frame from the cocked position to the fired position.

29. (Currently Amended) The device of Claim 28, further comprising release means for releasing the frame from the cocked position and allowing the spring means to move the frame to the fired position.

30. (Original) The device of Claim 29, wherein the one or more rack segments form a parallelogram.

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31. (Original) The device of Claim 26, wherein the one or more rack segments form a parallelogram.

32. (Original) The device of Claim 26, wherein the predetermined path along which the frame moves is non-linear.

33. (Cancelled) A method of creating a laceration with a lance, the method comprising:
moving a pinion along a predetermined path comprising an oblique angle;
constraining a lance holder to move in a linear motion immediately prior to reaching an extended position; and

coupling movement of the pinion to the lance holder such that the lance holder is extended when the pinion reaches a predetermined position on the predetermined path.

34. (Cancelled) The method of Claim 33, comprising stopping movement of the pinion when the pinion reaches the predetermined position.

35. (Cancelled) The method of Claim 33, comprising temporarily preventing the pinion from rotating when the pinion reaches the predetermined position.

36. (Cancelled) The method of Claim 33, comprising guiding a frame comprising the predetermined path along a predefined track.

37. (Cancelled) A method of creating a laceration with a lance, the method comprising:
moving a pinion along a predetermined path;
coupling movement of a lance holder to movement of the pinion; and
preventing the lance holder from extending beyond a predetermined depth.

38. (Cancelled) The method of Claim 37, comprising:
retracting the lance holder from the predetermined depth; and
rotating the pinion in a single rotational direction, wherein rotating the pinion causes the lance holder to sequentially extend and retract.